SCHOOLYARD SURFACES IN OUR WATERSHEDS

NSTA DECEMBER 12, 2019
SEATTLE, WA
WHO ARE WE?

Blandy Experimental Farm, University of Virginia

Field ecology research station

State Arboretum of Virginia

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LEAD ENVIRONMENTAL EDUCATOR

LILLIAN LEDFORD
ENVIRONMENTAL EDUCATOR
UNIVERSITY OF VIRGINIA'S
BLANDY EXPERIMENTAL FARM AND
THE STATE ARBORETUM OF VIRGINIA

OUR MISSION: TO INCREASE
UNDERSTANDING OF THE NATURAL
ENVIRONMENT THROUGH RESEARCH
AND EDUCATION.
EDUCATION OUTREACH

• HANDS-ON, OUTDOOR EXPERIENTIAL FIELD INVESTIGATIONS

• >7000 PREK-12 STUDENTS PER YEAR

• INQUIRY PROGRAMS

• CORRELATED TO STATE AND NATIONAL STANDARDS

• FIELD-BASED STEM LEARNING

• TEACHER PROFESSIONAL DEVELOPMENT WORKSHOPS
MWEE CONNECTIONS
LAND ACKNOWLEDGEMENT

WE WOULD LIKE TO ACKNOWLEDGE THAT WE ARE GUESTS IN THIS WATERSHED, LOCATED ON THE TRADITIONAL AND UNCEDED LAND OF THE FIRST PEOPLE OF SEATTLE, THE DUWAMISH (DKHW DUW’ABSHE) PEOPLE PAST AND PRESENT, AND HONOR WITH GRATITUDE THE DUWAMISH AND THE LAND ITSELF.
UNDERSTANDING WATERSHEDS
SCHOOLYARD SURFACES INVESTIGATION

KEY CONCEPTS:
❖ HUMAN IMPACTS
❖ RUNOFF
❖ EROSION
❖ PERMEABLE SURFACE
❖ IMPERMEABLE SURFACE
❖ STORMWATER MANAGEMENT
Thank you!

BLANDY EDUCATION WEB PAGES & RESOURCES

HTTP://BLANDY.VIRGINIA.EDU/EDUCATION
ENGINEERING DESIGN PROCESS-NGSS

Grades 3-5

Define
Specify criteria and constraints that a possible solution to a simple problem must meet

Develop solutions
Research and explore multiple possible solutions

Optimize
Improve a solution based on results of simple tests, including failure points

Grades 6-8

Define
Attend to precision of criteria and constraints and considerations likely to limit possible solutions

Optimize
Use systematic processes to iteratively test and refine a solution

Develop solutions
Combine parts of different solutions to create new solutions

Grades 9-12

Define
Attend to a broad range of considerations in criteria and constraints for problems of social and global significance

Optimize
Prioritize criteria, consider trade-offs, and assess social and environmental impacts as a complex solution is tested and refined

Develop solutions
Break a major problem into smaller problems that can be solved separately
**Scientific Inquiry Process**

1. Observe & explore
2. Ask questions
3. Ask more questions
4. Observe & experiment
5. Reflect on results & investigation

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**The Engineering Design Process**

1. **Imagine** - What are some solutions?
2. **Ask** - What is the problem?
3. **Plan** - Draw a diagram.
4. **Create** - Follow a plan and create (test) it.
5. **Improve** - Make your design even better (test it).
6. **The Goal**
ENGINEER TO SOLVE A PROBLEM

TRIAL 3: DESIGN, BUILD, AND TEST A SYSTEM TO MITIGATE THE IMPACTS OF WATER RUN-OFF FROM YOUR ROOFS.

Use the same model from Trial 2.
MWEE CONNECTIONS

**Issue Investigation.** Roof model activity can be used to investigate an issue.

**Student Questions:** What happens to the water that fall on my roof? The roof at school?

Students create an action project based on these questions.

The roof model activity could be the engage piece to **Stewardship and Civic Action** empower students to adapt and apply the knowledge they have constructed through investigation. As students develop a claim, identify solutions, design plans, and take informed action, they gain additional MWEE essential elements.
REFLECTION

1. **Does this investigation integrate content areas?** If so, which content areas?

2. Can this investigation be extended to include additional content areas?

3. Why integrate content areas?

4. What instructional strategies promote integration?
KEY INVESTIGATION QUESTIONS

1. HOW DO OUR BUILDINGS IMPACT THE WATER CYCLE?
2. WHAT CAN WE DO TO LESSEN THE IMPACTS OF ROOFTOP WATER RUN-OFF?